TEACHER'S GUIDE

for

THE McDUFFY READER

A Braille Primer for Adults

by

Sharon L. M. Duffy

National Federation of the Blind

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--Sharon Duffy

OVERVIEW

This textbook is designed for students in an adult training center, supervised by a teacher. However, a portion of the teacher's guide is available in recorded form as a student's supplement. This should help both students working independently and those working with a teacher. The tape is not a substitute for a teacher, but since a number of people will use this book without a teacher, I thought I would help them.

I have borrowed many ideas from other Braille textbooks and from other Braille teachers in order to produce not just another textbook, but one that reflects collective knowledge of the teaching of Braille to adults. Yet, I doubt I have thought of everything, so use your imagination in teaching using this text.

This teacher's guide offers suggestions about how to teach touch reading, slate writing, and Perkins Brailler usage. It also offers specific suggestions about detecting additional problems that prospective Braille readers may have. Articles providing general information about Braille music, highly contracted forms of Braille, and how to adapt Braille to meet individual needs are included. A lesson by lesson guide provides suggestions, which can be useful for the student working alone or supplement what you as a teacher will provide.

Use the table of contents of the textbook to locate the introduction of all signs and punctuation. Since the table of contents is written in Grade 2 Braille, it is of no value to beginning students. Later it will be useful to students as a reference.

All lessons begin on the top of a page. The page numbers and lesson numbers match through Lesson 18 so that beginning students can find the lessons more easily.

All students should study the Grade 1 section of this book. It should suffice for those only wishing to learn Grade 1. Those wishing to learn Grade 2 should keep going. The Grade 2 section does not introduce words in partly contracted form as some other textbooks do. If a sign is used before it has been introduced ... oops! I have tried not to use words which are not properly contracted. This has the advantage that students may study previous lessons within the Grade 2 section without becoming confused about the proper contraction of words. Students wishing to read with speed will want to learn to recognize words as words and familiar letter-groups in properly contracted form as quickly as possible. Also, you as a teacher will have less trouble reading properly contracted Braille. I also believe the organization of this book will help you to remember which things your students know and which they don't at any given time.

The text is organized to assist adults to learn the pattern upon which Braille is designed. Adults, unlike children, learn best when they can make use of patterns. Braille was designed with a pattern in mind. Tell your adult students about it. The first ten letters are unique and use only the top four dots of the cell. The second ten letters are the first ten with dot 3 added. The third group: u, v, x, y, and z are the first 5 with dots 3-6 added. W does not follow the pattern, because French, Louis Braille's language, did not contain a w at that time.

The signs for <u>and</u>, <u>for</u>, <u>of</u>, <u>the</u>, and <u>with</u> are the final five combinations using dots 3-6. They are introduced right after the alphabetic word-signs. The rest of the one-cell signs are introduced more or less in order as they appear in the seven lines of Braille. Then the two-cell signs are introduced, with the initial-letter contractions first, followed by the final-letter contractions. The short-form words are introduced last, because they will require less study than signs introduced earlier. These are taught in logical groups as much as possible.

The drills can be used to test students to see if they have learned the material, to diagnose problems, and to determine where to begin a student who needs a refresher course. The timed drills can also be used for diagnostic purposes. The timed drills can be used to develop quick word recognition and to challenge your students to read faster. Use five-minute timings.

Students who are not interested in the finer points of punctuation can skip Lessons 53 and 54.

The charts at the end of the text can be used for the study of signs and punctuation. The accompanying rules of usage, although somewhat simplified, reflect usage in most situations, and are intended as good, general guidelines for Braille usage.

TEACHING BRAILLE READING

The most difficult aspect of learning Braille that most adults face is developing the sense of touch. Some adults have additional problems such as memory or basic literacy, and it is important to determine to what extent these other two issues are a problem before beginning to teach Braille to an individual.

Memory Problems

If a student seems unable to tell which of the first five characters he/she feels on the first page after some practice, it might be well to discover if the problem is at least partly memory. A fast way to determine this is to use a Braille cell model. It can be made of wood with pegs representing dots, a mold with marbles for dots, or an egg carton with small objects for dots. Teach the student the five letters using this model and do some drill by setting a letter and asking what it is. If the student still cannot determine which one it is after a few minutes' drill, it is likely that there are memory problems. You may wish to reconsider whether this individual should learn Braille at this time. Do <u>not</u> allow the student to practice repeatedly with such a device instead of reading Braille, since developing touch is the most difficult part of Braille for adults. Drilling the letters or signs using such a device will be of no benefit if a student cannot recognize the dot patterns on a page. Therefore, confine your use of this device to diagnostic testing and an occasional memory drill.

Determining Basic Literacy

You do not need reading test results or transcripts to find out what you need to know in order to determine this. Generally, determining basic literacy can be done by asking a person how much reading he/she did as a child. Keep in mind that many partially sighted children may have read print so poorly in school that they have never developed the habit of reading for pleasure. Therefore, inquire as to whether they once read for pleasure, or whether they read schoolwork only. Persons who never read for pleasure are generally poorer readers than those who read on a regular basis. Also, individuals whose native language is not English may never have read English print. Naturally persons with learning disabilities may also have additional problems learning Braille.

Although learning is often more difficult for these individuals because of their reading deficits, there isn't any reason not to teach them Braille if motivated. It is helpful to

be aware of such factors so that assistance in phonics and basic rules of spelling can be emphasized.

Touch Problems

As previously stated, most adults will have the greatest difficulty with developing touch. The solution is plenty of practice. However, twenty minutes every day is better than an extended period every now and then. Beginning touch readers often experience fatigue which manifests itself in insensitivity in the fingers. The only cure is rest. How long to rest depends on the individual. Some people can rest for five minutes and go on quite well after that. Others must wait until the next day to resume reading. Suggest that the student let his hands hang down, wash them, or soak them in warm water to restore feeling.

If a student begins to read poorly as compared to a few minutes earlier, urge him to rest for a time. If slate writing skills have been introduced, do twenty minutes of reading, twenty of writing, and twenty more of reading. An hour is quite sufficient for a Braille lesson.

Common reasons for touch problems are neuropathy due to diabetes or other circulatory diseases, calluses on the fingertips, and age. However, many diabetics and individuals well into their seventies have successfully learned Braille. Motivation is as much of a factor as actual physical ability to feel the dots. Don't write such people off just because they fall into one of these categories.

Some individuals will need larger Braille and a jumbo slate to write with. I recommend the Braille Series, 1960, Volume One, for such individuals. It has larger dots and teaches survival Braille.

Sleepshades

Since touch is a major problem for most adults, those with some residual sight will be tempted to look at the dots when they become stuck. Also, some individuals can see enough to help track lines across the page. People will also tend to try to look while writing instead of using their fingers. These things will not ultimately help an individual read or write Braille. Interpoint Braille, the form which is most common in books, is difficult to read visually. Therefore, from the beginning, insist that students with any sight wear sleepshades both in reading and writing.

How Much Braille to Teach

As you will have noticed, this book contains two sections. The first teaches Grade 1 Braille and the second teaches Grade 2. Some individuals will only want to learn Grade 1 Braille. They may do so using this book. Should they decide to continue, they can proceed without acquiring another book. This is one reason this book is divided in this way. Persons with some touch problems may not desire to know Grade 2, since they only intend to make notes to themselves. Persons who wish to read books in Braille, however, must learn Grade 2 Braille.

Hints on Touch Reading

Research on Braille reading shows that two-handed Braille readers are faster than one-handed Braille readers, and that the fastest of these readers use the hands somewhat independently. Some research indicates that the middle finger also is very sensitive and contributes to the reading process. Strangely enough, some studies show that a majority of Braille readers have greater sensitivity in the left hand, regardless of handedness. These findings suggest that beginning Braille readers should be encouraged to use both hands in reading and at least the first two fingers of each hand. Also, individuals should be encouraged to use whichever hand seems most competent to read the majority of the text while the other hand assists in keeping the place and reading some of each line.

Two-handed reading has one other major advantage. That is, a student accustomed to using both hands will not have difficulty in learning to read Braille charts and graphs, or in scanning a page for headings or blank lines. These activities are much more difficult for one-handed readers, since they frequently miss things on the page. Also, charts and maps virtually require the use of both hands somewhat independently to locate coordinate points.

A light touch is better for tactile sensation. Lift the fingers of your students from time to time to remind them to use a light touch. Side to side motions are more productive than up and down or circular motions. Suggest that your students read through an entire word when they become stuck on a letter to encourage the student to keep his fingers moving and to read in context.

Don't let a student struggle too long on any one letter. The point is to get over as much ground as possible. A student can study the material alone later if he wishes to go over it himself. There isn't anything sacred about any particular letter or word. Covering the material is more important.

In the beginning, suggest that students slide both hands back across the line just completed and then make the drop. Eventually, your students will learn to slide the hands back in a slightly diagonal manner to reach the next line, which is faster. However, beginners often have trouble keeping on the right line if they do this. Suggest that students pick a page and practice tracking lines without reading, to help develop this ability. If students lose their places, tell them the line on the page they were on (for example, Line 7), and have them find it to develop the ability to count lines quickly. If students can remember the lines they are on while working independently, they can find them again if the place is lost.

You will want, above all else, to encourage your students to practice independently. Teaching them how to find their places again will be of great value for this reason. As with any other skill, practice will improve Braille reading.

TEACHING SLATE WRITING

When to Begin

This depends upon how much Braille an individual is going to learn. Students who are planning to learn only Grade 1 should begin writing after they have completed the letter "t" and do not have confusion about the letters. Students intending to learn Grade 2 can wait until they have completed the alphabet. I recommend these general guidelines, because you want to work with students on writing for a time before you complete lessons. However, you do not want to confuse them with slate writing before the letters are firmly in mind. The student must know by rote the dot numbers for each letter to be written, so that this information can be used in punching the dots.

Concepts of Slate Writing

Most people can learn to use a slate and stylus without great difficulty if basic concepts are understood. When writing with a slate, begin from the right and move left. By reorienting dots for writing with dots 1-2-3 on the right and 4-5-6 on the left, your student can know by rote which dots comprise any letter on the slate. Therefore, teach your students the dot numbers for each letter as they learn to read Braille. Then they can use this rote memory to know which dots to punch to write each letter. Discourage students from thinking about slate writing as backwards. Consider that by starting from the right and moving left, the first dots written are 1-2-3 and the second dots written are dots 4-5-6 just as in reading. Although theoretically this appears difficult, in practice I have had no students who could not grasp this concept. Within two or three weeks, most students have little trouble with reversed letters, or do so with only those letters which they typically reversed while reading--the letters "e" and "i" for instance.

Just as writing with a pen requires considerable practice, so does writing with a slate. Encourage your students to write with a slate in most situations when they would have used a pen as sighted persons. Occasionally, however, a Braille writer will be more convenient for certain tasks--math, long documents, or writing which needs careful rereading as you go. Most Braille users who were competently trained using both the slate and the Braille writer use a Braille writer when one is available and noise is not a problem, and they use a slate for note-taking in classes and meetings and away from home or office. The reason is the same as the reason that sighted people do not carry a typewriter everywhere they go--it is too noisy and cumbersome.

Since you want your students to be comfortable using each method, considerable practice with a slate is necessary and some

instruction in the use of a Braille writer is necessary. Teach the use of the slate first, as the relative ease of using a Braille writer will seem handier to a beginner, although not practical or convenient in many situations.

You don't want your students to carry a Braille writer to classes, as one student did at my university. When I came to class the first day, slate in hand, the professor told me later that he had sighed with relief at not having to shout over the Braille writer. Nor do you want to hinder the chances of success of your students by not giving them adequate skills to take notes in class, and having them resort to recording--a very inefficient way to handle lectures. It takes at least twice the time to tape and then take notes later. A student taking notes with a slate only needs to hear the lecture once as sighted students do. Full-time college students or those who are also working do not have that much time. Besides, blind students must develop learning methods which are equivalent to sighted students' methods so that they can compete at work.

Paper

A slate can be used with almost any weight of paper, and the kind of paper used depends much on the situation. For beginners, 100 weight (heavy) paper is best because it is easier to do accurate work with heavier paper. It is also true that an experienced Braille slate user can write faster on light-weight paper. I take college notes on regular notebook paper for this reason. It will last through a semester if not abused.

Regular index cards work well for addresses, phone numbers, recipes, etc. Use 3 by 5 inch cards for phone numbers only, 4 by 6 inch cards for addresses and phone numbers, and 5 by 8 inch cards for recipes. Heavy Braille paper is slightly heavier than these cards, but they hold up quite well.

Slates

A standard pocket slate has four lines and 28 cells per line. It is suitable for 8-1/2 inch wide paper. Most adults prefer this slate for writing on standard sheets of paper, and I recommend it as the beginning teaching tool. Such slates can be bought with Dymo Tape slots, but beginners often confuse the slot with the first Braille cell, so I don't recommend this unless the slots are in the bottom of the slate. Four by six card slates also come with slots, and I prefer having the slots on this slate and recommend it to my students as a second slate.

Plastic pocket slates are available from the NFB for about $2.00--much cheaper than metal ones, and they are comparable writing tools, although they may not be as durable.

Inserting the Paper

Direct students to put the hinge on the left and open the slate. If using punched paper, the holes go to the right. Line the paper up with the top and along the hinge. Hold the paper down in the center with a finger as long as possible while closing the slate, making sure that the pins have pricked through the paper. Students should be able to hear and feel that they have done so.

As you begin to work with students, check their work every line or two and give them practice removing and replacing the paper, although at first it may seem faster to do it yourself. They can replace the paper by matching the holes to the pins and need practice in learning to do this.

To move the paper down, the student should open the slate and lay it flat on the table, pins up. Direct her to find the two bottom holes made by the pins and move the paper up and place the bottom pin holes in the top pins. As the student closes the slate, she should be able to hear and feel the punching of the two new bottom holes.

Drills

Regardless of ability, use the same set of exercises for all students. Vary the amount of practice necessary for each type of drill depending on performance.

The first thing to have students write is not the alphabet. Begin instead with four lines of full cells. Explain the concept of dots 1-2-3 being on the right and 4-5-6 being on the left, and insist that these dots be written in order to drill students in this unique writing mode. Check the work and move on if most cells are complete. If not, or if a student can't stay on the line, continue having him/her do a line at a time while you check for accuracy. Once a line is produced with few or no errors, move on.

Next, suggest a line of the letter "1," again reinforcing the notion that dots 1-2-3 are on the right. If accurate, then write lines of "c's," colons, hyphens, and "x's." How many lines of each depends on how accurately it is performed. Insist on no more than three errors per line at first.

Next have your students do one line of each letter of the alphabet, checking frequently to catch errors before they become habits. Ask students to rewrite any unacceptable lines and describe the kinds of errors--e.g., reversed letters, dropped letters, dots on the wrong side of the cell, vertically misplaced dots, or skipped dots.

Have students write a copy or two of the alphabet or as much of it as is known at the time. Suggest an exercise for independent practice such as going through the alphabet starting with "a" and putting it between each other letter of the alphabet: aaabacadae ... babbbcbdbe ... cacbcccdce ... on through the alphabet.

The following series of exercises should help reinforce good habits of slate writing. Encourage students to write these as rapidly as possible without making too many errors.

Have students do groups of similar letters with spaces between. Examples are: ak, bl, cm, dn, eo, fp, gq, hr, is, jt, ku, lv, mx, ny, oz, mn, kl, mu, xy, yz, xz, no, ux, uv, rw, ou, st, km, um, etc.

When accuracy seems good, an average of no more than three errors per line consistently, encourage your students to write some words, their names, and short sentences. Continue to assign some drills from time to time. Go to three letter drills such as: aku, blv, cmx, dny, eoz, fpr, gqp, hrw, ist, jtq, mux, xyz, abc, mnu, qpr, prt, wtr, fed, lie, hid, dif, hef, etc.

Time your students to challenge them to speed up.

From this point forward, intersperse reading and writing to build both skills. Each skill will reinforce the other, and dividing lessons into segments of reading and writing can reduce fatigue and boredom in both.

Do not skip these drills with quick learners. Building speed and accuracy requires practice. These exercises will build good slate writing habits and will reduce the amount of confusion that writing from right to left could create if you jump into writing words and the alphabet too soon. They will enhance skills of students who can write words accurately and should be done periodically as a skill building exercise.

As a student proceeds into Grade 2 Braille, exercises can begin to reflect the new signs. For instance you can have them write fp(and), gq(for), hr(of), is(st), ku(ch), and so on.

Graduate to short words and sentences. Check frequently for errors. Assign students to copy sentences from the book as well. Although this is tedious at first, skill in this area is

necessary if a student is to read Braille and take notes or copy information from Braille.

As new signs are introduced, have students write an entire line of each, and then assign words with similar combinations in them such as: ghoul, though, rough, sigh, whet, when, spar, arts, start.

Also, make a cassette of words and sentences, and have a student practice doing this to build speed and to work independently. Read things from the book or invent exercises.

Once accuracy is established, begin finding things for a student to Braille which are relevant to each individual--a personal phone number list, address cards, grocery lists, recipes, labels for various items, letters to friends, journals, etc. Braille can be used to label computer disks, VCR tapes, cassettes, record albums, file folders, clothing, spices, canned goods, cubbyholes for sorted items, playing cards, medicines, household cleansers, large appliances such as microwaves, washers, woks, ovens, etc.

Discuss possible uses for Braille with each student and do what will make a difference to each. One student kept an inventory of supplies for the beauty salon she managed. Another labeled cubbyholes containing parts for lawn mowers he repaired. A third used Braille to make notes for college courses he was teaching.

The possibilities are endless, so don't neglect to teach your students well this valuable and versatile skill. They will thank you later for teaching this skill.

SLATES, TAPES, BRAILLE WRITERS, COMPUTERS, AND

IS BRAILLE BECOMING OBSOLETE?

It has been said that with the advent of technology, Braille may be becoming obsolete. It has also been said that, with the advent of technology, we would become a paperless society. Neither assertion has proven to be accurate. We generate more paper than ever with the help of technology, and Braille can be produced more easily than ever before because of technology. Furthermore, to take advantage of the technology, a knowledge of Braille is extremely helpful in reading manuals, making notes of procedures to follow in using the equipment, labeling computer disks, etc. No, technology has not decreased the need for good, basic Braille skills any more than computers have reduced the need for sighted people to learn print. Quite the reverse has actually occurred.

The need for literacy has not decreased either. Such things as spelling, paragraphing, and punctuation cannot be adequately learned without a written medium. For the blind student, that means Braille. The exact way in which mathematical and other technical material can be represented in a written medium cannot be duplicated with a computer equipped with speech or on tape. For these reasons, neither print nor Braille is in any danger of becoming obsolete.

Slates. However, some teachers have sighed with relief believing that they no longer need to teach good slate writing skills because of technology such as the Braille 'n' Speak. As mentioned before, sighted people have not abandoned handwriting in favor of laptop computers, although many people use both, each for different kinds of tasks. Having notes on paper is still widely accepted as the norm in classrooms and boardrooms across the country. Blind people need slate writing skills just as much as their sighted peers need handwriting skills. Schools have not abandoned handwriting. They have simply added keyboarding skills to the list of necessary skills kids need to learn.

Tapes. Tapes--although useful for reading prerecorded texts and for taping live readers--are not a viable alternative to reading and writing Braille. A tape recorder is not a substitute for taking notes. Who has the time to hear things twice anyway. Good notes with a slate are comparable to what sighted students have, and time can be spent on doing the other things that sighted students spend their time doing. After all, if taping classes or meetings is such a good idea, why don't most sighted people do it? They have tape recorders, too.

Braille writers. Braille writers are another matter. They also are not in danger of becoming obsolete as yet. Just as

typewriters do not replace handwriting, Braille writers do not replace slate writing. They are faster than slates for some individuals and have the advantage of allowing the individual to read back without turning over the paper. This is a distinct advantage in doing math or in composing. However, I don't recommend teaching the Braille writer before good slate writing skills are established. Using a Brailler requires little teaching, so can be done easily at the end of training.

EASY GUIDE TO NEMETH CODE

(Editor's note: For the print edition of this article, the beginning fraction indicator will be represented by a "less than" sign "<," and the ending fraction indicator will be represented by a "greater than" sign ">," and dots 4-5-6 will be represented by a vertical bar "|." Instead of using brackets and braces, the brackets are represented by an accent mark and the appropriate parenthesis "`( `)" and braces are represented by a colon and the appropriate parenthesis ":(:)" in order to illustrate Braille usage. Number signs are present where they would appear in Braille.

When describing two-cell symbols, they will be written with the word dots followed by the dot numbers for the first cell, a comma, and the dot numbers in the second cell.)

Many beginning Braille students have an immediate need for math, and so I have included this article in the teacher's guide to assist you in teaching some basics. Braille copies of this article are available for 50 cents apiece from the Braille Action Laboratory. Enterprising students may want their own copies.

Over the years, a number of people have asked me to write them a list of the basic math symbols. Rather than continue to give these out piecemeal, here is a list. This is not intended as a comprehensive guide to the Nemeth Code, but as a reference for the most commonly used applications, and as a means to begin learning the Nemeth Code.

First, it is important to note that numbers in the context of Nemeth Code are dropped within the Braille cell. That is, they utilize the bottom four dots of the Braille cell (dots 2-3-5-6) instead of the top four (dots 1-2-4-5). This is done for easy distinction between numbers and letters. Also, before each string of numbers, the number sign should be used but need not be repeated so long as there is no space between characters. If a string of numbers is preceded by an initial fraction indicator or other numeric symbol containing dot 1 or 4, the number sign is unnecessary since the level of the character can be discerned. Since punctuation marks also utilize the bottom four dots of the cell, a punctuation indicator (dots 4-5-6) should precede punctuation marks which immediately follow numbers.

Following is a list of some basic symbols and examples of their use:

Plus symbol + (dots 3-4-6)

Minus symbol - (dots 3-6)

Times symbol (cross) x (dots 4, 1-6)

Times sign (dot) · (dots 1-6)

Division symbol ÷ (dots 4-6, 3-4)

Fraction line / (dots 3-4) or |/ (dots 4-5-6, 3-4)

Equals symbol = (dots 4-6, 1-3)

Divided into, divisor followed by "o" and the dividend ⟌

Decimal point . (dots 4-6)

Comma , (dot 6)

Here are some simple problems using these symbols:

#3+4 = #7
3 plus 4 equals 7.

#10-3 = #7
10 minus 3 equals 7.

#2x5 = #10
2 times 5 equals 10.

#20÷3 = 6 r2
20 divided by 3 equals 6 remainder of 2, written r, dot 5, 2

#3⟌26
3 into 26

Fractions and mixed numbers are written differently in Nemeth Code than they are in literary Braille. As you will recall, the number three and one-half is written #3-1/2 in literary Braille, but since the numbers are dropped and the hyphen is the minus symbol, this must be modified in Nemeth Code. Also, it is necessary to indicate exactly when a fraction begins and ends in an algebraic expression. Fractions that are defined by being written somewhat vertically need to be defined with fraction indicators in Braille. Numbers on a line separated by a slash should not be defined with fraction indicators. The opening fraction indicator is the "th" sign (dots 1-4-5-6) and the closing fraction indicator is the "ble" sign, (dots 3-4-5-6).

The beginning fractional part of a mixed number indicator is "|<" (dots 4-5-6, 1-4-5-6), and the closing one is "|>" (dots 4-5-6, 3-4-5-6).

Here are examples of each:

<6/8> = <3/4>
Six-eighths equals three-fourths.

#2|<1|/4|> = <9/4>
Two and one-fourth equals nine-fourths.

Parentheses, brackets, and braces are a necessary part of mathematical expressions. The regular parentheses cannot be used, because they would be confused with the 7. Therefore, the opening parenthesis is the "of" sign, (dots 1-2-3-5-6), and the closing parenthesis is the "with" sign (dots 2-3-4-5-6). To make brackets, the opening parenthesis symbol is preceded by dot 4 and the closing parenthesis is preceded by dot 4. Therefore, "`(" (dots 4, 1-2-3-5-6), and "`)" (dots 4, 2-3-4-5-6) respectively are the opening and closing brackets. Opening braces (curly brackets) are ":(" (dots 4-6, 1-2-3-4-5), and closing braces are ":)" (dots 4-6, 2-3-4-5-6).

Here are examples of these:

#2(6-3) = 6
2 times the quantity 6 minus 3 equals 6.

#3`(16 (10-6)`) = #12
3 times opening bracket 16 divided by opening parenthesis 10 minus 6 closing parenthesis, closing bracket, equals 12.

#2:(3+`(8-(2x-2)`):) = #18
2 times opening brace, 3 plus opening bracket, 8 minus opening parenthesis, 2x minus 2 closing parenthesis, closing bracket, closing brace, equals 18.

Geometric shapes are represented with an "ed" sign (dots 1-2-4-6) immediately followed by a code letter, a space, and the coordinate points or letter identifying the shape. Here are a few common shapes:

"ed" sign "ow" sign = angle
"ed" t = triangle
"ed" c = circle
"ed" i = intersecting lines
"ed" r = rectangle
"ed" (dots 2-5-6) = square

"ed" p = perpendicular lines
"ed" l = parallel lines

Superscripts and subscripts are also a part of Nemeth Code. Three to the fourth power is written:

Number sign, dropped three, dots 4-5, dropped four.

3 subscript 4 is written:

Number sign, dropped 3, dots 5-6, dropped 4.

Radicals are expressed with symbols which define square roots and other roots. To write the square root of three, an "ar" sign (dots 3-4-5) should precede the three and the "er" sign (dots 1-2-4-5-6) should follow it. For cube roots and above, a "gh" sign (dots 1-2-6) should precede the number of the root, an "ar" sign should follow it, then the number to be divided into, followed by an "er" sign.

Here are examples:

"ar"16"er" = #4
The square root of 16 equals 4.

"gh"3"ar"27"er" = #3
The cube root of twenty-seven equals three.

The Nemeth Code represents dollar signs differently than in literary Braille. The dollar sign is written: dot 4, s. The decimal point remains the same, dots 4-6.

`s3.50 Three dollars and fifty cents.

Also, the cent sign is written: (dot 4, c). The cent sign immediately follows the number of cents, as it does in print.

#85`c
Eighty-five cents.

Math problems can be set up in the same way as print problems written up and down. This is easiest to do with a Braille writer, writing the answer as you work the problem. Here is an example problem:

```
  21
 +34
-----
  55
```

21 plus 34 equals 55.

Here is an example of a problem involving fractions:

```
  <5/ 6>
 -<1/ 4>
---------
  <7/12>
```

Five-sixths minus one-fourth equals seven-twelfths.

Here are a few miscellaneous signs which may be useful:

Is less than < (dots 5, 1-3)

Is greater than > (dots 4-6, 2)

Degrees, both angle and temperature, dots 4-5, 4-6, 1-6

Multipurpose indicator is dot 5. It is used to terminate superscripts and subscripts, and is placed between letters and numbers to indicated that the number is not a subscript of the letter, as in quotients with remainders.

Percent sign % (dots 4, 3-5-6) immediately follows the number, as it does in print.

Pi is written (dots 4-6, p)
Therefore, pi r squared is written: dots 4-6 p, r, dots 4-5, dropped 2.

Should you require more detailed information regarding the Nemeth Code, please contact the Library of Congress and request <u>The Nemeth Braille Code for Mathematics and Science Notation</u>, 1972 Revision.

ABOUT GRADE 3 BRAILLE

Grade 3 Braille is the most popular form of highly contracted Braille in use in the U.S. today. Hadley School for the Blind offers a correspondence course in Grade 3 which I highly recommend. Grade 3 is used for writing personal notes. It is not widely available in books, although the Library of Congress has a collection of books in Grade 3 which could be of help to a beginner to develop skills.

Grade 3 may be desirable for college students and secretaries--anyone needing a fast way to write--but is not appropriate for a beginning Braille student. Some of the symbols are so similar that most beginning Braille readers would have difficulty telling them apart. The Grade 3 sign for "better" (dot 4, b) and the Grade 2 short-form sign for "about" (ab) is a good illustration of this problem. Also, Grade 3 is not appropriate for a beginning Braille student because a beginner is altogether too likely to confuse Grade 2 and Grade 3 signs.

This is because the inventors of Grade 3 very cleverly built upon the principles of Grade 2 Braille. For instance, there are additional shortform words such as (ack) for "acknowledge," there are additional double letter contractions such as (dots 2-3-6) meaning r-r in the middle of a word, and there are additional two-cell words such as (dot 4, w) for "willing."

Grade 3 uses several methods of saving space. "Outlining" is used to shorten up words by eliminating all nonessential vowels within words. Grade 3 also saves considerable space by allowing certain groups of words to be written without spaces between. Two-cell contractions may appear one after the other, for instance. Specified forms of the verb "to be" may appear between two words without intervening spaces. There are other spacing rules as well.

As an experienced Grade 3 user, I recommend this highly contracted form of Braille. It is useful in labeling things, because you can leave out some vowels, write the same thing with fewer cells, and perfectly understand what you have written. I use it in writing my diary and personal notes. When I am writing something, I can do a quick edit by adding in Grade 3 signs and rubbing out dots from a Grade 2 draft. In college, it enabled me to write more quickly with a slate than most of my classmates could write longhand in print.

For these reasons and because this system is easy to learn, causes very little confusion in reading it back, and observes most of the Grade 2 contractions, I highly recommend it for the experienced Braille reader.

ABOUT BRAILLE SHORTHAND

Braille Shorthand has been in use in the U.S. for many years. Materials about Braille Shorthand can be obtained from the American Printing House for the Blind.

Like Grade 3, Braille shorthand should not be taught to beginning Braille users. Its use of contractions varies considerably from Grade 2 usage because of its intended purpose as an abbreviated form of Braille.

Braille Shorthand is a more highly contracted form of Braille than Grade 2 or Grade 3. It is patterned after print shorthand. It uses many symbols which represent a particular sound but may be spelled in different ways. Like print shorthand, it uses phonetic spelling. It also uses abbreviations for common phrases in the business world such as "sns" to mean "as soon as." For secretaries who are required to take shorthand, this is an excellent system because of its brevity and application for business use.

ABOUT BRAILLE MUSIC

Braille music has been around as long as there has been Braille. This is because Louis Braille was a musician. In some ways, it is probably one of the most difficult print systems to translate into Braille because of its graphic nature. However, the music system in current use does accurately represent every aspect of print notation. The reasons for learning Braille music are the same as those for using print music--to reproduce composers' works accurately.

Braille music is not available at most regional libraries. The Library of Congress has a Braille Music Section which will lend materials directly to borrowers. In this way, Braille music readers can have all music produced in the United States available to them.

Braille music uses letters of the alphabet to represent the notes of the scale. They are not the same letters, however. For instance, the letter J represents B. If dots are added to this J, it changes the note value. For example, J with a dot six added means B a quarter note.

There are ways to write time signatures, sharps, flats, and naturals; ways to indicate octaves; staccatos and slurs; quarter notes, half notes, and measure rests; ... every conceivable nuance conveyed by print music.

Adults who are involved in music as a career or hobby may want to learn Braille music to continue their production of new music. Children who wish to participate in band or to play piano or guitar will want to learn Braille music as a means to understand the nature of music and to play along with their sighted peers. As a child, I learned Braille music and used it to play in a public school band in high school. It was well worth the effort both in increasing my understanding of music and my appreciation of it.

REFERENCES FOR BRAILLE TEACHERS

American Association of Workers for the Blind, et. al. Code of Braille Textbook Formats and Techniques. Louisville, KY: American Printing House for the Blind, 1977.

American Association of Workers for the Blind and the Association for the Education of the Visually Handicapped. English Braille: American Edition--1959. Louisville, KY: American Printing House for the Blind, 1986.
(This book can be acquired from the Library of Congress by anyone wishing to become a Braille transcriber or proofreader. It systematically lists all Braille contractions and rules of usage, and it is an excellent reference work. It is available in Braille and print.)

American Association of Workers for the Blind, Association for Education of the Visually Handicapped, and the National Braille Association. The Nemeth Braille Code for Mathematics and Science Notation (1972 Revision). Louisville, KY: American Printing House for the Blind, 1973.
(This is the official code book for Nemeth Code.)

Braille Authority of North America. Code for Computer Braille Notation. Louisville, KY: American Printing House for the Blind, 1987.
(This is a list of the computer Braille code, and it can be obtained from your Braille lending library in Braille.)

DeGarmo, Mary Turner. Introduction to Braille Music Transcription. Washington, D.C.: Division for the Blind and Physically Handicapped, Library of Congress, 1970 with 1983 addendum.

Dorf, Maxine B., in collaboration with Barbara H. Tate. Instruction Manual for Braille Transcribing. Washington, D.C.: Library of Congress, 1984.
(This book can be obtained from the National Library Service by anyone wishing to become a certified transcriber or Braille proofreader, and is available in print and Braille.)

Downing, Winifred. Grade 3 Braille for Taking Personal Notes. Winnetka, IL: Hadley School for the Blind, 1970 revision.
(This book is available only to students taking the Hadley course in Grade 3 Braille. I highly recommend this course for serious students of Grade 3 Braille.)

Duffy, Sharon L. "Easy Guide to Nemeth Code." Louisville, KY: Braille Action Laboratory, University of Louisville, 1988. (This is a Braille ten-page description of common mathematical symbols, and is available for fifty cents per copy. It is not available in print from this source.)

Rodenberg, L. W., Key to Grade Three Braille. Louisville, KY: The American Printing House for the Blind, embossed and printed for the Illinois School for the Blind, Jacksonville, IL, 1974.
(This is a comprehensive list of the Grade 3 system. It is not a textbook.)

Willoughby, Doris M., and Sharon L. M. Duffy. Handbook for Itinerant and Resource Teachers of Blind and Visually Impaired Students. Baltimore, MD: National Federation of the Blind, 1989.
(This book contains chapters on teaching Braille and a version of the "Easy Guide to Nemeth Code." It is available in print, Braille and cassette.)

CONTENTS OF STUDENT'S CASSETTE

WHAT THE TEXT CONTAINS

The textbook you are about to use contains two sections (called books in the text), a Grade 1 Braille section and a Grade 2 Braille section. In this way, students who wish to learn only Grade 1 Braille may do so. Included in this section are exercises which will help build reading ability, first with spaced letters and short words, then short phrases and sentences. Numbers and basic punctuation are also introduced. The beginning pages are double spaced for easier reading. Later, two lines are put together, then three, and then paragraphs are double spaced to help you gradually learn to track single spaced lines. Introduction of punctuation marks is interspersed with the letters of the alphabet.

You will notice that each new lesson begins at the top of a page and each page from Lesson 1 to 18 is the same as the lesson number, so that you can look at the top right hand corner of the page to find both your lesson and page number. After Lesson 18, the page and lesson numbers no longer match, as some lessons are more than a page in length.

The first page is the title page. The next 5 pages are the table of contents, which can be used to determine where any particular letter, punctuation mark, or composition sign is introduced. The next page is a list of the alphabet, numbers, and all punctuation and composition signs introduced in the Grade 1 section of this book. You can learn about the organization of Braille by studying this page. Have your teacher explain how each line of symbols builds on the previous line to make the new characters. Lesson 1, Page 1, is the next page, the eighth page in this book.

Instructions on using Braille to label things, including playing cards, recipes, jokes, and poetry are shown to illustrate how they are done in Braille. You will want to practice making labels to suit your own needs.

The Grade 2 section of this book begins with signs of one cell, then presents signs comprised of two cells, and ends with the short-form words which are the easiest to remember. The readings on each page contain not only exercises to help you learn the signs introduced on the top of the current page, but also contain signs already learned. You should already be writing by the time you begin the Grade 2 section. Writing the sentences and paragraphs on the bottom of the pages or making up your own will also assist you in memorizing the signs.

At the end of each group of signs mentioned above is a drill designed to test your knowledge of the signs just learned. If you have trouble with this drill, back up in the text and reread pages containing signs which are not familiar to you. Within the Grade 2 section of this book, all words appear in correct Grade 2 form. Thus, rereading old lessons within this section will not be confusing to you.

Time yourself in a five-minute timing the first time you read each drill and determine the number of words per minute. Don't despair if you read 5 words per minute. Study the drill carefully and time yourself another day. This will help you gauge your progress. Then move on to the next section.

Timed drills appear at the end of the short-form words section. Read them and time yourself with five-minute timings before you have studied them. Then study them, and time yourself again. Any signs which you do not readily recognize should be studied further. Return to the lesson in which they are introduced. Read it again and write words with these signs in them.

These drills are not only designed to help you drill the signs you have learned, but also should assist you in recognizing very common words, as they are drawn from lists of common words. Recognizing common words will vastly improve your overall reading performance. Therefore, study these drills and test yourself repeatedly on each page.

A short article called "Reading and Writing Braille" concludes the teaching in this book. It is written in Grade 2 Braille, the form in which you will find published books. If you can read this article, you have mastered standard, literary Braille.

At the end of the book, you will find a chart of Braille contractions with rules of usage and a chart of punctuation with rules of usage. These charts can be used as further aids in learning.

LESSON GUIDE

Braille is composed of six dots arranged three high and two wide. Any combination of up to six dots arranged in this fashion is called a Braille cell (c-e-l-l). The dots within each cell are numbered. The upper left dot is dot 1, the middle left dot is dot 2, and the bottom left dot is dot 3; the upper right dot is dot 4, the middle right dot is dot 5, and the bottom right dot is dot 6. As each new symbol is introduced, the dot numbers will be given for it. This will help you visualize each combination and will be helpful when you learn to write.

Turn now to the seventh page in your book to learn more about the organization of Braille. This page follows the title page and the contents pages and is Page vii. The top line reads: Book One, Grade 1 Braille vii. The next line reads: (This page illustrates the organization of Braille.) The next line contains the first ten letters of the alphabet--a through j. They use only the top four dots of the cell--dots 1, 2, 4, and 5. The next line contains the next ten letters of the alphabet--k through t. These are made by adding dot 3 to the first ten letters.

Thus the letter a is dot 1 and k is dots 1-3. B is dots 1-2 and the letter l is dots 1-2-3, etc. The letters are vertically lined up, so that you can easily tell this pattern. The next line is u through z. You may notice that w does not fit the pattern and does not vertically line up with letters above it. This is because the French alphabet, Louis Braille's alphabet, did not contain a w, so it was added later. The letters u, v, x, y, and z are the first five letters with dots 3-6 added. Other contractions in Braille use the rest of these combinations plus others which you will learn later.

The next line down contains the numbers, which are the letters with a Braille number sign preceding each to indicate it is a number not a letter. The j preceded by a number sign is a zero.

The rest of this page contains punctuation marks which will be taught in the first section of this book. They are cells containing only the bottom four dots of the cell (dots 2, 3, 5, and 6.) They will be explained as we go.

Take advantage of Braille's organizational pattern as you learn it. It will help you along until you have memorized each combination of dots.

Lesson 1

Lesson 1 begins on Page 1 of the text, which is the eighth page (counting the title page), the contents pages, and the page just discussed. On the top line of each lesson is the word Lesson followed by the number sign and the number. In the upper right-hand corner is the page number. For the first 18 lessons, the page and lesson numbers will be the same. After that, some lessons are longer than one page.

Lesson 1 introduces the first five letters of the alphabet, and they appear in order on the line below the top line. A is dot 1, b is dots 1-2, c is dots 1-4, d is dots 1-4-5, and e is dots 1-5. A is the single upper left-hand dot, b is two dots on top of each other on the left, c is the top two dots side by side, d is three dots which would make the upper right corner of a rectangle, and e is two dots on a diagonal from upper left to middle right.

On the rest of the page are letters or words separated by three full cells.

Use both hands to read across the page and use a light touch. Do not move your fingers vertically or around in a circle, but lightly back and forth across the dots.

Lesson 2

Lesson 2 introduces the letters f and g. F is dots 1-2-4, and g is dots 1-2-4-5. F looks like the upper left-hand corner of a rectangle, and g looks like a little square.

Lesson 3

Lesson 3 introduces the letters h and i. H is dots 1-2-5, and i is dots 2-4. H looks like the bottom left-hand corner of a square, and i is a diagonal line from middle left to upper right.

Lesson 4

Lesson 4 introduces the letter j, the capital sign, and the period. The letter j is dots 2-4-5, and looks like the bottom right-hand corner of a square. The capital sign is a signal that the letter after it is uppercase. It is dot 6, the lower right-hand dot in the Braille cell. The period is dots 2-5-6. It looks like a dropped d, because that is what it is.

If you feel carefully on the second line of this page, you will first find a j, then a capital sign immediately followed by a full Braille cell (so you can tell which single dot it is),

then the words "capital sign," another full cell immediately followed by a period and then the word "period." Although you haven't had all of these letters yet, should you wish to refer to this page later, you will then be able to determine what is introduced here. Also by using the alphabet listed on page vii, you can spell out these words.

There are some short sentences on this page separated by three full cells.

Lesson 5

Lesson 5 introduces you to the number sign, dollar sign, decimal point, and the numbers. The number sign is dots 3-4-5-6, and the dollar sign is a dropped d (dots 2-5-6) followed immediately by a number sign. On the third line on this page is a full cell followed immediately by a decimal point, dots 4-6, followed by the words "decimal point."

The fourth line on this page reads: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Remember that the numbers are the first ten letters with a number sign preceding them. The j is the zero, not the o. Therefore, number sign, a is 1; number sign, b is 2; number sign, c is 3; number sign, d is 4; number sign, e is 5; number sign, f is 6; number sign, g is 7; number sign, h is 8; number sign, i is 9; and number sign, a, j is 10. See if you can spot famous dates, common light bulb wattages, and popular cassette lengths among these numbers.

Lesson 6

Lesson 6 introduces k and l. K is dots 1-3 (a with dot 3 added). L is dots 1-2-3 (b with dot 3 added). It also resembles a print lower case l.

Lesson 7

Lesson 7 introduces m and n. M is dots 1-3-4 (c with dot 3 added), and n is dots 1-3-4-5 (d with dot 3 added).

Lesson 8

Lesson 8 introduces the letters o and p. O is dots 1-3-5, and p is dots 1-2-3-4. The Braille p resembles a print capital p.

Lesson 9

Lesson 9 introduces the comma and the question mark. On the second line of this page is a full cell followed immediately by a comma (dot 2), then the word "comma," then another full cell followed immediately by a question mark (dots 2-3-6), and the words "question mark." A question mark looks like a dropped Braille h.

Lesson 10

Lesson 10 introduces the letters q and u. The q is dots 1-2-3-4-5 and the u is dots 1-3-6. The u is introduced out of order, because it is impossible to use a q without a u except in Iraq.

Lesson 11

Lesson 11 introduces the letters r, s, and t. R is dots 1-2-3-5, the s is dots 2-3-4, and the t is dots 2-3-4-5. You will notice that letters are first spaced apart, and then repeated as words on the first two lines of this page.

Lesson 12

Lesson 12 introduces the apostrophe, the ellipsis, the semicolon, and the colon. The second line on this page contains a full cell immediately followed by an apostrophe (dot 3), the word "apostrophe," another full cell, ellipsis (three dot 3's), and the word "ellipsis."

The third line of text contains a full cell followed immediately by a semicolon (dots 2-3), the word "semicolon," another full cell followed immediately by a colon (dots 2-5), and the word "colon."

The next two lines of text are contracted words containing apostrophes.

Lesson 13

Lesson 13 introduces the letters u, v, and w. The u, as you recall, is dots 1-3-6, the v is dots 1-2-3-6, and the w is dots 2-4-5-6.

Lesson 14

Lesson 14 introduces the letters x, y, and z. X is dots 1-3-4-6, y is dots 1-3-4-5-6, and z is dots 1-3-5-6. Now you know the entire alphabet plus the comma (dot 2), semicolon (dots 2-3), colon (dots 2-5), and the period (dots 2-5-6). You will notice that these marks of punctuation resemble a, b, c, and d, and represent ever increasing pauses from comma to period. You also know the apostrophe (dot 3), and the ellipsis (dots 3, 3, 3). You've done well!

Lesson 15

Beginning with this lesson, you will notice that some of the lines are closer together. Until now, everything has been double spaced for easier reading. It will be especially important for you to keep both hands on the line to keep from skipping lines.

Lesson 15 introduces you also to the hyphen, dash, and exclamation point. The second line of text contains a full cell immediately followed by a hyphen (dots 3-6), the word "hyphen," another full cell followed immediately by two hyphens or a dash (dots 3-6, 3-6). The next line contains a full cell immediately followed by an exclamation point (dots 2-3-5), and the words "exclamation point." An exclamation point looks like a dropped Braille f.

You may have noticed that the first line of the exercise is indented two spaces from the left margin. This is the way paragraphs are indented in Braille. Also, Braille paragraphs are not necessarily preceded by a blank line.

Lesson 16

Lesson 16 introduces the quotation marks, parentheses, slash, and double capital sign. Line two contains an opening quotation mark (dots 2-3-6) immediately followed by a full cell and a closing quotation mark (dots 3-5-6), and the words "quotation marks." The opening quotation mark looks like a dropped Braille "h." The closing quotation mark looks like a dropped Braille "j."

The next line contains an opening parenthesis (dots 2-3-5-6) immediately followed by a full cell and a closing parenthesis (dots 2-3-5-6), and the word "parentheses." Both the opening and closing parentheses look like dropped Braille "g's." Then there is a full cell immediately followed by a slash (dots 3-4), and the word "slash."

The next line contains a double capital sign (dot 6, dot 6) immediately followed by a full cell and the words "double capital sign."

You will notice that the opening and closing quotation marks are different symbols in Braille, and that the opening and closing parentheses are the same symbol in Braille. This is somewhat different than print usage. Also, print has no equivalent to the Braille double capital sign. Its purpose is to inform the reader that all of the letters within a word are capitalized.

Lesson 17

Lesson 17 is a drill and introduces no new symbols. If some of the punctuation or the numbers are a problem for you, go back and study them further.

Lesson 18

Lesson 18 introduces you to conventions of writing recipes. Try the recipes. They're wonderful!

Lesson 19

Lesson 19 begins on Page 20 and is a reading exercise. More lines are single spaced here, so be careful to stay on the right line. Slide your fingers back to the beginning of the line before dropping to the next one. Read this more than once if necessary.

Lesson 20

Lesson 20 begins on Page 22. Perhaps you can think of better jokes. I certainly hope so!

You have now completed Grade 1 Braille and the first section of this book. Good for you!

Lesson 21

Lesson 21 begins on Page 25 and is the first lesson in the Grade 2 section of this book. It introduces the first half of the alphabetic word-signs. These are letters of the alphabet which stand for whole words when they stand alone. They may not be used in the middle of words, because they would be confused with the letters that they are. They may be used when separated

by hyphens such as in the hyphenated word to-do, which is written t-o, hyphen, d. Other punctuation may accompany them as well.

The format may be strange to you. The first line of this page reads: Book Two, Grade 2 Braille, Page 25. The next line reads: Lesson 21. Then come two columns across the page with the alphabetic word-signs introduced on this page. Read the left-hand column first, then the right-hand column. They are: b, but; c, can; d, do; e, every; f, from; g, go; h, have; j, just; k, knowledge; l, like; m, more; n, not.

The rest of this page is devoted to sentences containing these contractions for drills. Many of the lessons in this section of this book follow a similar pattern.

Lesson 22

Lesson 22 begins on Page 26 and introduces the rest of the alphabetic word-signs. They are: p, people; q, quite; r, rather; s, so; t, that; u, us; v, very; w, will; x, it; y, you; and z, as. Note that there are not signs for: a, i, and o. These are already words.

Lesson 23

Lesson 23 begins on Page 27, and introduces five new symbols which stand for very common words: "and," "for," "of," "the," and "with." These signs may be used as whole words or as parts of words whenever the letters they comprise appear. They also may follow one another without spaces between words. The word "a" may also follow any of them without a space between words.

The a-n-d sign is dots 1-2-3-4-6; the f-o-r sign is a full Braille cell, dots 1-2-3-4-5-6; the o-f sign is dots 1-2-3-5-6; the t-h-e sign is dots 2-3-4-6; and the w-i-t-h sign is dots 2-3-4-5-6. These signs are alphabetically in order.

In this exercise, the first line is the lesson number, and the second and third lines are the introduction of the new signs. Then there are two lines of words containing the a-n-d sign; two lines with words containing the f-o-r sign; two lines containing words with the o-f sign, including one word in which you may not use the o-f sign; and two lines containing words with the t-h-e sign. The next line contains one line which not only drills the w-i-t-h sign, but also illustrates groupings of these new whole-word signs written without spaces between them.

The rest of the page contains three sentences packed with the new signs, and ends with a short paragraph. You will notice that the alphabetic word-signs also appear with regularity. I

have tried to incorporate previous signs as you advance through the book to help you remember them as you go.

This might be a good time to talk in general about the rules for the use of Braille contractions. There are books on this subject, but I have simplified them in the charts at the end of the book and will explain the rules as signs are introduced on this cassette.

The first general rule, the one which won't allow you to write an o-f sign in "professor" is that you should not use a sign when it overlaps major syllables. Other rules like this are: Don't use a sign when it would obscure the usual appearance of a word or when it would obscure the pronunciation of a word.

There are rules about how to choose the right contraction when there is a choice. For instance, choose the sign which would save the most space. When a choice must be made between signs saving the same amount of space, choose one-cell signs over two-cell signs, and choose the "and," "for," "of," "the," and "with" signs over other one-cell signs. However, mostly you will learn the rules by how you see things written, so don't worry too much about it at first.

Lesson 24

Lesson 24 begins on Page 28 of the text and introduces five more new signs. Remember when I mentioned that there is a pattern in Braille. These five signs are the first five letters of the alphabet with dot 6 added. Furthermore, they are arranged alphabetically in order, a helpful hint in memorization.

The first one is the c-h sign (dots 1-6). When it stands alone, it is the word "child." The second one is the g-h sign (dots 1-2-6). The third one is the s-h sign (dots 1-4-6). When it stands alone, it is the word "shall." The fourth sign is the t-h sign (dots 1-4-5-6). When it stands alone, it is the word "this." The fifth sign is the w-h sign (dots 1-5-6). When it stands alone, it stands for the word "which."

Below the introductory lines, there are lines of words introducing each of the new signs and a short paragraph at the bottom of the page.

Lesson 25

Lesson 25 begins on Page 29 of the text and introduces four more new signs. They are the e-d sign (dots 1-2-4-6), the e-r sign (dots 1-2-4-5-6), the o-u sign (dots 1-2-5-6), and the o-w sign (dots 2-4-6). Only one of these signs represents a word.

That is the o-u sign, which stands for the word "out" when it stands alone. Again, pairs of lines for each new sign are given. There are a number of sentences at the bottom of the page. It would not be a bad idea to Braille these sentences to practice slate writing skills and to fix the new signs in your mind.

Lesson 26

Lesson 26 begins on Page 30 and introduces five new one-cell signs, all containing dot 3. The line below the lesson number contains a c-o-m sign (dots 3-6) immediately followed by a full cell, the letters "c-o-m," a full cell immediately followed by an "s-t" sign (dots 3-4), the letters "s-t," and the word "still." The next line begins with an a-r sign (dots 3-4-5) followed by the letters "a-r," an i-n-g sign (dots 3-4-6) followed by the letters "i-n-g," and the b-l-e sign (dots 3-4-5-6) followed by the letters "b-l-e."

As usual, two lines each are devoted to drilling each of these new signs, and the page concludes with a number of sentences which would be appropriate material to use for writing practice.

The c-o-m sign, because it is the same character as the hyphen, may never be used where it would be confused with the hyphen. It may begin a word or begin a line in a divided word, so long as it is not the final syllable of the word. It must not be used when it would come into contact with a hyphen, dash, or an apostrophe because of the confusing appearance of such combinations.

The b-l-e and i-n-g signs may not begin a word, but may be used in the middle or at the end of a word, or may begin a new line in a divided word.

Lesson 27

Lesson 27 begins on Page 31 and introduces six lower one-cell signs. These signs look much like the letters a, b, c, d, f, and g, except that they use the bottom four dots of the cell instead of the top four dots. You will also recognize them as the same dots as those in the comma, semicolon, colon, period, exclamation point, and parentheses, respectively. For this reason, these signs are restricted so that they appear only where you would not expect to find punctuation marks--in the middle of words. These signs may not be used at the beginning or the end of a word and may not stand alone. They also have the lowest priority for usage when a choice between two one-cell signs must be made. They are: the e-a sign (dot 2), the b-b sign (dots

2-3), the c-c sign (dots 2-5), the d-d sign (dots 2-5-6), the f-f sign (dots 2-3-5), and the g-g sign (dots 2-3-5-6).

As usual, pairs of lines with words introducing each sign follow. At the bottom of the page is a sentence using many of these new signs.

Lesson 28

Lesson 28 begins on Page 32 of the text and introduces four more lower, one-cell signs.

Recall that dots 2-3 in the middle of a word represents b-b. Now, should you see dots 2-3 at the beginning of a word, this means "b-e." Also, if dots 2-3 are found standing alone, they represent the word "be."

Recall that dots 2-5 in the middle of a word means c-c. Now, should you see dots 2-5 at the beginning of a word, it means "c-o-n." This sign may not appear alone.

Recall that dots 2-5-6 in the middle of a word means d-d. Now, should you see this at the beginning of a word, it means "d-i-s." It cannot stand alone.

The e-n sign (dots 2-6) is the last new sign on this page. It may be used at the beginning of a word, in the middle of a word, or at the end of a word. When it stands alone, it is the word "enough." The contraction for the word "enough" may not be used when in contact with punctuation. In such a case, it should be written e-n sign, o-u sign, g-h sign.

This page finishes in the usual way.

Lesson 29

Lesson 29 begins on Page 33 and introduces the final set of lower, one-cell signs.

Recall that dots 2-3-5 in the middle of a word represent f-f. When this sign precedes other dots, it is the word "to." It must be used without a space between it and the next word and may never stand alone or be accompanied only by punctuation.

Recall that dots 2-3-5-6 in the middle of a word means g-g. Now, if this sign stands alone, it represents the word "were." However, it must not be used in contact with punctuation except the capital and italic signs.

The next sign (dots 2-3-6) is the word "his" when it stands alone. It must not be used in contact with punctuation except the capital or italics signs.

Dots 3-5 are the i-n sign. This sign may appear at the beginning of a word, in the middle of a word, at the end of a word, or stand by itself as the word "in." However, it may not come into contact with punctuation as a word, so must be spelled out in such a case.

Dots 3-5, 2-3-5 stand for the word "into" when placed in contact with another word. It must not stand alone or come into contact with punctuation in this form. If it stands alone or is in contact with punctuation, it should be written i-n sign, t-o.

The last sign introduced here is dots 3-5-6. When this sign comes in contact with dots, it is the word "by." When it stands alone, it is the word "was."

In general, if two or more of these signs appear together, and there is no letter or contraction containing dot 1 or 4 adjacent to them, the second lower sign should not be used.

As you have already deduced, there are fairly complicated rules of usage associated with these particular signs. Observe carefully how they are used. If you consider that these rules are designed to keep confusion from occurring as to which sign is intended, you will find it easier to remember how to use them. For instance, all of these signs except the e-n and i-n signs double as punctuation marks found at the end of words. Therefore, they may not be used at the end of words. The chart at the end of the text will give you more specific rules of usage. Study it when you get there, not now. There's time enough for that.

Lesson 30

Lesson 30 begins on Page 34 and is a drill of the one-cell words. Read it over to see if you remember all of the signs you have learned. If you have trouble with any of them, return to the pages on which they were introduced, read them over, and copy sentences found on the bottom of the page.

Challenge yourself by doing a five-minute timing using Lesson 30. Restudy it carefully and time yourself again. These are very common words, and easy recognition of them will increase your reading speed.

Lesson 31

Lesson 31 begins on page 35 in the text and introduces the first of the two-cell whole- and part-word contractions. These two-cell signs are called initial-letter contractions, because the letter which follows a combination of dots 4, 5, and 6 is the first letter or group of letters in this sign. They make signs that can be used as words or parts of words. They may be used as parts of words as long as they retain their original sound, except in the case of "one" which may be used almost any time. Recall that one-cell signs, the ones you have already learned, take precedence over the two-cell signs.

This page has two columns of new signs. They are: Dot 5, d for "day;" dot 5, e for "ever;" dot 5, f for "father;" dot 5, h for "here;" dot 5, k for "know;" dot 5, l for "lord;" dot 5, m for "mother;" dot 5, n for "name;" and dot 5, o for "one."

Lesson 32

Lesson 32 begins on Page 36 and introduces more two-cell signs. They are: dot 5, p for "part;" dot 5, q for "question;" dot 5, r for "right;" dot 5, s for "some;" dot 5, t for "time;" dot 5, u for "under;" dot 5, w for "work;" and dot 5, y for "young."

Lesson 33

Lesson 33 begins on Page 37 and introduces five more two-cell signs. They are: dot 5, t-h-e sign for "there" spelled t-h-e-r-e; dot 5, c-h sign for "character;" dot 5, t-h sign for "through;" dot 5, w-h sign for "where;" and dot 5, o-u sign for "ought."

Lesson 34

Lesson 34 begins on Page 38 and introduces five more two-cell signs. All of these begin with dots 4-5. They are: dots 4-5, u for "upon;" dots 4-5, w for "word;" dots 4-5, t-h-e sign for "these;" dots 4-5, t-h sign for "those;" and dots 4-5, w-h sign for "whose," (w-h-o-s-e).

Lesson 35

Lesson 35 begins on Page 39 and introduces six more of the two-cell signs. All of these signs begin with dots 4-5-6. They are arranged in two columns and are: dots 4-5-6, c for "cannot;" dots 4-5-6, h for "had;" dots 4-5-6, m for "many;" dots 4-5-6, s

for "spirit;" dots 4-5-6, w for "world;" and dots 4-5-6, t-h-e sign for "their" spelled t-h-e-i-r.

Lesson 36

Lesson 36 begins on Page 40 and is a drill of the two-cell words you have learned. If you have trouble remembering them, go back to the earlier lessons and study them. Do not go on until you have these firmly in mind.

Lesson 37

Lesson 37 begins on Page 41 and introduces the first part of another group of two-cell signs called final-letter contractions. They are called final-letter contractions because the letter that follows the combination of dots 4, 5, and 6 is the final letter of the group. Therefore, dots 4-6, n means "s-i-o-n," n being its last letter. These signs must not stand alone or begin a word. They may be used in the middle or at the end of words. They are: dots 4-6, d for "o-u-n-d;" dots 4-6, e for "a-n-c-e;" dots 4-6, n for "s-i-o-n;" dots 4-6, s for "l-e-s-s;" and dots 4-6, t for "o-u-n-t."

Lesson 38

Lesson 38 begins on Page 42 and introduces the group of final-letter contractions beginning with dots 5-6. They are: dots 5-6, e for "e-n-c-e;" dots 5-6, g for "o-n-g;" dots 5-6, l for "f-u-l;" dots 5-6, n for "t-i-o-n;" dots 5-6, s for "n-e-s-s;" and dots 5-6, t for "m-e-n-t."

Lesson 39

Lesson 39 begins on Page 43 and introduces the last group of final-letter contractions. They are: dots 5-6, y for "i-t-y;" dot 6, n for "a-t-i-o-n;" and dot 6, y for "a-l-l-y." The a-t-i-o-n sign should be used in preference to the t-i-o-n sign, since it saves the most space.

Lesson 40

Lesson 40 begins on Page 44 and is a drill of the final-letter contractions. Study it carefully. If you do not easily recognize all words, return to earlier lessons for further study. Do not go on until you know these thoroughly. Time yourself using this drill, study more, and time yourself again.

Lessons 41 Through Lesson 46

Lesson 41 begins on Page 45. Lessons 41 through 46 introduce the last group of contractions, the short-form words. These contractions may be used as words or as parts of words, so long as they would not be confusing to the reader. For instance, "f-r-l-y" can be used for the word friendly, but "b-l-(e-d) sign" may not be used for the word "blinded," because it looks like the word "bled." Also, these signs can be used for entire proper names but not as parts of proper names to prevent confusion about unusual spellings found in proper names. There are very specific rules about some of the words, but remembering the basic principle of clarity will resolve most questions about this.

Lesson 47

Lesson 47 begins on Page 51 and is a drill of the short-form words. Study it and time yourself using it.

Lesson 48

Lesson 48 begins on Page 52 and is a timed drill of the one-cell words. The first time you read this page, time yourself. Get a friend or your teacher to follow along and count your errors. Do five-minute timings. This will serve as a pre-test against which you can compare your progress. If you have forgotten some signs, return to Lessons 21-29 for further study. Do more timings. Study the pages carefully and do more timings.

Lesson 49

Lesson 49 begins on Page 53 and is a timed drill of words using two Braille cells. These are common words, and easy recognition of these words will greatly improve your reading speed. Take a five-minute timing the first time you read through it. Then study it carefully and take another timing. If you are still not satisfied that you're recognizing these words quickly enough, study more and try again.

Lesson 50

Lesson 50 begins on Page 55 and is a timed drill on words using two or three Braille cells. Again, they are common words, and studying them will help your overall reading ability. Do timed drills as described above.

Lesson 51

Lesson 51 begins on Page 56 and is a timed drill of words using three Braille cells. Study all three pages of this exercise and do more timings using these pages.

Lesson 52

Lesson 52 begins on Page 59 and is a timed drill of the final-letter contractions. Take a five-minute timing the first time you read through this page. If you have problems remembering the final-letter contractions, turn back to Lessons 37, 38, and 39.

Lesson 53

Lesson 53 begins on Page 61 and is the introduction of some less common punctuation and composition signs. If you are not interested in these, you may skip this and the next lesson.

The single or inner quotes, the brackets, the accent sign, and the asterisk are introduced in Lesson 53.

The opening single quotes are written: dots 6, 2-3-6; and the closing inner quotes are written: dots 3-5-6, 3. The opening bracket is written: dot 6, dots 2-3-5-6; and the closing bracket is written: dots 2-3-5-6, 3. The accent sign, represented by a slanted line over a letter in print, is a dot 4 before the accented letter. The asterisk or star is written: dots 3-5, 3-5.

Lesson 54

Lesson 54 begins on Page 62 and introduces single italics, double italics, the letter sign, and the termination sign.

The italic sign is dots 4-6 and serves to replace both the underline and slanted letters used in print. The italic sign is placed immediately before the word to be emphasized. A double italic sign is dots 4-6, 4-6 and is used when more than three words need to be italicized. The double italics precedes the first word of the group to be italicized, and a single italics is placed before the final word of the group to be italicized.

The letter sign is dots 5-6 and is unique to Braille. It is used when a letter might otherwise be confused with a number or with a contraction for which it ordinarily stands.

The termination sign is also unique to Braille. It is dots 6, 3 and can be used to terminate both full capitalization and italics. This lesson further elaborates on the uses of these punctuation and composition signs.

Reading and Writing Braille

Read through this and then choose something to begin reading. You now know Grade 2 Braille, and the Braille library is open to you free of charge. Subscribe to your favorite magazine in Braille. Congratulations!! You've made it.

Chart of Grade 2 Braille Contractions

This chart is organized in the order in which you learned the contractions in this book. Each group of signs is titled and listed. Then general rules of usage are given. Use this chart to memorize signs or to help you understand correct usage. However, reading will teach you best how to use Braille.

Chart of Punctuation

The last thing in this book is a chart of the punctuation and composition signs. Each symbol is given first on the line, with full cells to assist in determining dot locations, then the name of the mark followed by the dot numbers.

After the entire list of punctuation marks is given, the rules of basic usage are given.

TIPS ON TOUCH READING

The most difficult aspect of learning to read Braille as an adult is developing the sense of touch. Therefore, the more reading a student can do the better. Although drills using lists of contractions can be helpful, they will not ensure a student's ultimate facility in Braille. The student who knows that dots 1-2-4-6 means an e-d sign, but cannot recognize it on the page, does not have a useful skill.

Hand Movement

Studies consistently show that the best Braille readers use both hands somewhat independently, one hand reading part of the line, and the other reading the rest. Use as many fingers as is convenient--four, six, or eight fingers. By developing sensitivity in as many fingers as possible, you will increase your versatility as a Braille reader. Charts, Braille graphs, and maps will be easier to read if you can scan with several fingers at once. Also, if you are scanning material for paragraph breaks, blank lines or other format changes, a maximum number of fingers scanning will speed up this process.

Many persons will have a preference for one hand over the other--not necessarily the dominant hand. Many excellent Braille readers who are right-handed have the most sensitivity in their left hands. Why this is the case, no one knows.

As you develop reading speed, you may wish to experiment with making a diagonal drop from right to left in making the return sweep with your hands. In the beginning, retrace the line back to the beginning with both hands and then drop to the next line. This will help you stay on the right line.

Don't wait till you are proficient to begin developing good habits of reading. Start at the beginning using both hands and work to develop touch with as many fingers as possible, even though you will probably have a natural preference for some over others. Remember that practice makes permanent. Consider the permanent habits of Braille reading that you are developing as you begin to read Braille.

Avoiding Touch Problems

Use a light touch as you read. Although the dots may not be clear to you, pushing harder will make the problem worse. Fingers in motion can feel more than fingers resting in one place, so move your fingers lightly across the line. If you have difficulty feeling a particular character, read through the

entire word, picking out the characters you easily recognize and read it again. Do not move your fingers up and down or around in circles, just back and forth horizontally across the word. To read efficiently, you will want to learn to recognize words as a whole, not just individual letters or contractions.

Set aside no less than 20 minutes nor more than an hour to study Braille reading during each session. Spend time each day working on Braille. Many adult beginning readers find that they can feel the dots well for 20 minutes and then cannot do well. This phenomenon is like learning to skate. Once you get tired, you won't do as well, and the only cure is rest. Some people can rest five or ten minutes and then continue. Others must wait until the next day to resume. Do not despair. Your stamina will improve naturally as you continue to practice Braille. Experienced Braille readers tested after six hours of reading, showed consistent recognition ability with results tested before the six hour reading period.

Alternating reading and writing exercises can be helpful for students wishing to continue working on Braille in a continuous session.

Do not, if you are working with a home teacher, try to cram your Braille into three or four hours the day of or before her visit. Twenty minutes a day will yield far better results. As a home teacher, I always knew the difference, especially those students who worked hard the day I came, because they were already tired and performed poorly as a result.

Skill Building Exercises

To develop good line tracking skills, find a page in the text with single-spaced lines. Count the number of lines on the page. (There should be 25 if it is full.) Set a timer for one or two minutes. Only counting lines, see how fast you can accurately count the lines on this page. Do not touch all characters on each line, nor attempt to pick out any individual characters or words. Practice this periodically, at the beginning of lessons, until you can do it twice a minute or more.

Now, being careful to touch every character on each line of the page, time yourself at one or two minute intervals until you can do a page a minute or more. Do not attempt to recognize characters as you scan the lines.

Next, slow down and repeat this exercise, but attempt to recognize one character per line, not necessarily the first character, but whichever one you happen to identify immediately. Repeat this a few times and strive to double your initial speed.

These exercises will help you conceive of the idea that you can actually move your hands much faster than you now do in reading. They will help you develop speed in tracking lines, and making quick return sweeps. Begin lessons with a few of these drills. Do not end lessons with them. Tired fingers will yield poorer results. Spend only five or ten minutes per lesson on such drills.

Once you have completed the alphabet and are beginning to be concerned about how slowly you read, get a friend to read a passage as you follow along, telling you the line changes and asking you to read a random word from each line. If you have more than one copy of the book in Braille, have a Braille reader do this with you. If you have a sighted friend who would like to help, the print version of the book will work as well. Instruct this person to read a little faster than you ordinarily do, but not so fast as to totally lose you. After you have completed Grade 2 Braille, you can choose any materials which can be obtained in duplicate for this purpose.

Choosing Your First Braille Book

When you choose your first reading book, find something with ordinary language. Don't start with a book with dialect or archaic language. If possible, pick something below your usual reading level--even a children's book. I frequently recommend Bunnicula, a children's book, as a beginner's book. Hemingway, O'Henry, and Frost are easy-to-read authors for adults. Books of American short stories, magazines such as Our Special or The Braille Mirror are good beginning materials as well.

Keep track of how long it takes you to finish a page. At first you may read only one or two pages an hour, but you will quickly double that rate and eventually read at a speed that will afford you much pleasure.

An average page of single-spaced Braille contains about 200 words. Use your gains in words per minute or pages per hour as motivators. Also, do five-minute timings to push yourself further. Read daily and use Braille for personal use at every opportunity. In about two years, you will be a proficient Braille user. This may seem like a long time, but it took you more than two years to become a proficient print user.

WRITING WITH A BRAILLE SLATE

You will want to begin slate writing as soon as you know most of the alphabet and the dot numbers for each of the letters you've learned. This is because in writing with a slate the dots will be renumbered. Since you are punching through paper, you will need to start writing from right to left. Rather than reversing the letters, think about reversing the dot numbers. That is, dots 1-2-3 are now on the right, and dots 4-5-6 are now on the left. Since you will be writing beginning with dots 1, 2, and 3 just as in reading, you will quickly learn to write from right to left. You don't have to spell words backwards either.

Although this may sound confusing at first, I have never had a student who learned Braille who could not master this concept and learn to use a slate. You can too.

A good standard slate to have is a 4-line 28-cell metal pocket slate available from several sources including the American Printing House for the Blind or Howe Press. It is advisable to start with regular Braille paper. If you use light-weight paper to begin with, you will find that you make many mistakes, even though you can write more quickly.

As with Braille reading, sleepshades are advisable. This skill can be done totally by touch. In fact, it works better that way as it was designed to be done without sight. You can feel what line you're on, which dots you're poking, and even retrace already punched dots all by touch.

To insert the paper, put the hinge on the left with the full cells on the bottom and the cut-outs on top. Open the slate. If you are using punched paper, the holes should go to the right. Line the paper up with the top and along the hinge. Hold the paper down with a finger in the center as long as possible while closing the slate. Make sure that the pins have punctured the paper. You should be able to hear and feel that they have done so.

To move the paper down, open the slate and lay it flat. Find the two bottom holes made by the pins, move the paper up, and place the bottom pinholes over the top pins. Close the slate, and again you should be able to hear and feel the pins puncturing the paper.

Do not immediately attempt to write the alphabet, your name, or other such things. You want to become accurate quickly. Begin by writing four lines of full cells from right to left, writing dots 1-2-3 on the right and then dots 4-5-6 on the left. Say these aloud as you write them to help you get this concept firmly in mind. Check your writing. If you have made more than

three errors in a line, do it over again until you are more accurate. If you have trouble staying on the line, keep practicing.

Next try a full line of the letter l. This is dots 1-2-3 which, while writing, are on the right side of the cell. Check your work. If you have more than three errors, do another line of l's.

After you have mastered this, try a line of c's, (dots 1-4), then a line of colons (dots 2-5), a line of hyphens (dots 3-6), and a line of x's (dots 1-3-4-6). Continue to monitor each line by removing the slate and feeling the line. If you find more than three errors, do another line for practice.

Once you can do these things, write a line of each letter of the alphabet you already know, checking for accuracy. Then try to write the alphabet or as much as you know of it.

Now try a line of each combination of the following letters with spaces between in order to practice spacing as between words: ak, bl, cm, eo, fp, gq, hr, is, jt, ku, lv, mx, ny, oz, mn, kl, mu, xy, yz, xz, no, ux, uv, rw, ou, st, km, um, etc. Write these as fast as you can without making too many errors. Now devise combinations of three letters, and write a line of each combination. Think of letters that are similar in configuration like mux, ice, blr, cmn, onq.

Time yourself to help encourage yourself to write faster. Repeat these drills from time to time to work on speed.

Now that you've mastered some degree of accuracy, put your skill to use. Begin an address list, write your grocery list--whatever you need Braille to do for you. Don't wait for a magical day when your skills are good enough. Practice will make them so. Practice writing your new letters and signs. Spend some time each day writing. Carry your slate with you and use it as a sighted person would use a pencil. It will serve you well in classes, at work, and at home.

USING THE PERKINS BRAILLER

If you have a Perkins Brailler you will want to make use of it in writing long items, mathematics, and items which you need to read over as you go. As a matter of fact, most blind people who own a Braille writer use it extensively for these purposes, perhaps more than sighted people use a typewriter in preference to a pencil. This is because using a slate requires the writer to turn the paper over to read it, and many people write more slowly with a slate, although practice with a slate can yield good writing speeds.

This is not to say these things cannot be done with a slate. They can and should be done at the whim of the writer, when a Brailler isn't available, or as is convenient. I prefer to write my prayer log and diary with a slate. I write rough drafts of articles with a slate while in transit. I often write cash counts and add them up with a slate, because it is convenient. Skill at using a slate for many purposes is necessary, if braille users are to be competitive with their sighted peers who carry pens as well as use typewriters.

The Perkins Brailler is totally mechanical and will operate for many years without servicing, many more than the average typewriter. I have a Perkins Brailler that is 20 years old which works very well and has only been serviced three times.

If available, read the instructions before using. Otherwise, do the following things.

1. Move the carriage, located on the front above the nine keys, to the far left as far as it will go by inserting an index finger in its cup and pushing it. It should make a clicking noise as you do this. This will not hurt the machine and is the best way to ensure that you have moved the carriage as far as possible to the left.

2. To insert paper, pull the paper release levers toward you. The levers work together and are located on either side of the top of this machine, and they can move either toward or away from you.

3. Insert Braille paper in the back between the two rollers called the paper support bar and grooved roller. Slide the paper to the left as far as it will go, against the left paper stop, a little rough knob with a screw in it. Push the paper release levers away from you as far as they will go.

4. Roll the paper in as far as it will go, using the paper feed knobs located on either side of the machine. Note that it rolls in the reverse direction from the average typewriter. When

rolled in, most of the paper is inside the machine. If the paper won't go in, you probably don't have it close enough to the left side of the machine.

5. Press the line spacer twice. It is the key on the front furthest to the left. Now roll the paper back one line. This establishes regular line spacing. If you neglect to do this before you begin to Braille, the first two lines may run together and the third may be too far down.

6. To set the margins, locate them on the back of the machine in a long slot. Move the carriage one space to the left of the desired left margin. By squeezing the little ball close to the flat projection, you can move the left margin against the carriage.

To set the right margin, move the carriage to the right to the last desired cell. The carriage can be moved to the right by depressing the right side of it and sliding it over or by using the space bar repeatedly. Squeeze the ball and flat projection of the right margin and move against the carriage. The bell will ring seven spaces before the margin stop.

7. To remove the paper, press the line spacer repeatedly until it will not move the paper or by rotating the paper feed knobs until they will not go further. Then pull the paper release levers up, toward you, and free the paper. Do not put the paper release levers up and remove the paper by force.

The Nine Keys. On the front of the machine are nine keys. As already described, the left most key is the line spacer. The right most key (which looks like the line spacer) is the backspace key. The central, largest key is the space bar. You can press it separately, and it will also automatically go down with any combination of the six dot keys you press.

The six remaining keys are the numbered dot keys. Dot 1 is just to the left of the space bar; dot 2 is to the left of that; and dot 3 is left of that. Dot 4 is just to the right of the space bar; Dot 5 is to the right of that; and dot 6 is to the right of that. By remembering the combinations of dots of the letters and signs, you can push the dots of each one. Push all keys for one cell simultaneously.

While not in use, put the carriage to the right, as this affords the least wear on the spring inside, and put the dust cover on your Brailler to protect it.

Enjoy your new tool. It will serve you well at home or office. However, don't neglect your slate writing skills.

You'll want your slate for taking notes when you're on the move--in meetings, or classes or the lab. Just as sighted people do not abandon writing with a pencil in favor of a typewriter, neither should you abandon your slate in favor of a Braille writer. Each has its purpose. Learn to use both well.

ADAPTING BRAILLE TO MEET YOUR NEEDS

Introduction

In addition to the literary Braille code, there are Braille systems of shorthand, mathematics and science, foreign languages, music, drawing, and computer-related materials. If you need to use one of these systems in textbooks or to share with other Braille readers, you may wish to study them in depth. However, you need not learn any of these formal systems in order to adapt Braille to meet your needs. Use your imagination and develop a consistent method for representing the things that you need to write down. For ideas on how to adapt Braille to meet your needs, read on.

Shortening Braille

Braille can be abbreviated in the same way that print can, with a period at the end of a significant piece of the word, by leaving out some vowels, or by leaving out unimportant words. There are two systems of Braille that are shorter than Grade 2 Braille that are used in the United States today, and another exists in the United Kingdom. Braille shorthand copies phonetic spelling and abbreviation of certain common business words and phrases such as "sns" meaning "as soon as." Grade 3 expands the number of short-form words, adds a few one-cell signs and leaves out spaces between certain groups of words. You can adapt any of these methods as long as you remember what you meant. If you really wish to have a good form of abbreviated Braille, consider taking Grade 3 Braille from the Hadley School for the Blind, a free correspondence school, but don't do it until you've known Grade 2 for about two years. You will not want to confuse Grade 2 and Grade 3 signs.

Editing Text

As a writer and Grade 3 user, I have found that if I write my first draft in Grade 2, I can edit without rewriting by inserting Grade 3 words and spacing, rubbing out a few dots, and going on. This makes a decidedly messy copy but can be faster than rewriting the entire work until I'm ready for a more major revision. Some people suggest writing each paragraph on a separate page, leaving large gaps between paragraphs, or writing on 5 by 8 cards so that they can be shuffled if the order should be rearranged. Personally, I prefer organizing before I write the first draft, but it's difficult to predict your brilliance, or at least your digressions from the original theme, until you write it down. Computers are truly wonderful for resolving such problems, but you may not have one or ever need one for your

usual writing if you use common sense tips in writing with editing in mind.

Mathematics and Science

The Nemeth Braille Code for Mathematics and Science Notation was designed for use in the classroom and on the job. It is precise and appears complex when studied as a whole. However, most sighted people do not understand all of the complexities of mathematical and scientific notation in print, and yet they are able to use those elements they need. I have written an article called "Easy Guide to Nemeth Code" which is available in Braille for 50 cents from the Braille Action Laboratory, Life Sciences Bldg., University of Louisville, Louisville, Kentucky 40292, phone: (502) 588-6722. If you only want a few symbols, here they are:

Plus sign is the "i-n-g" sign (dots 3-4-6), used without spaces on either side.

The minus sign is a hyphen (dots 3-6) either before the number sign in a negative number or between numbers in a subtraction problem.

The times sign is dots 4, 1-6. If a dot is used to represent the times sign, it should be represented as dots 1-6 (the c-h sign). Either sign appears between the numbers to be multiplied without spaces on either side.

You already know that a fraction line is the (s-t) sign (dots 3-4).

The division sign is dots 4-6, 3-4. This indicates that the second number is to be divided into the first. It is used without intervening spaces between the dividend and the divisor.

The equals sign is dots 4-6, 1-3. It looks like a rectangle of four slightly spread dots, and is written with a space on either side.

Nemeth Code also has all numbers dropped within the Braille cell to minimize confusion with letters which represent variables and unknowns within mathematical expressions. If you need to know more than this, buy the "Easy Guide" or ask someone who knows Nemeth Code to help you learn. If all else fails, assign your own set of symbols to meet your needs in math. There is no law that says you have to use standard symbols when writing notes for your own use.

Scientific notation may be necessary for defining chemical formulas or making diagrams. Capital letters followed by dropped

numbers can represent the number of atoms of each element in a particular compound. By creative use of Braille, diagrams can be made in Braille to aid in the learning of spatial relationships with such things as the muscles in the body. More about drawing later.

Foreign Languages

Braille as we know it, with 3 dots high and 2 wide, is widely used throughout the world. If similar letters exist, they are generally represented the same way in many different languages. Other languages also have contracted forms analogous to our Grade 2, although not all nations use these forms as widely as the English speaking world uses Grade 2 Braille. Texts to learn these languages are generally produced in what would be Grade 1, so you will be able to use these texts with minimal learning of new codes. Spanish, for instance, has accented letters which have the same shape as some of our Grade 2 symbols, but there are only six or so of these.

Music

Braille music has been used as long as Braille has existed, because Louis Braille was a musician and used his invention for music notation. It is not, however, a simple matter to learn, just as learning to read print music is not a simple matter. Check your regional library for texts teaching this or contact the Library of Congress, Library for the Blind, Braille Music Section. Music is available only from this source and usually is not available from your regional library.

However, if you simply want to note a melody or chord progression, there is no reason you cannot devise your own system for these simple tasks. For instance, I use capital letters to represent a particular major chord. If I want it to be a minor chord, I put a small m immediately after it. I space between measures. If I want to represent the chord "A Minor 7th" I would write a capital A, a small m, and then a dropped 7 (dots (2-3-5-6) immediately after it.

In real Braille music, octaves are represented by combinations of dots 4, 5, and 6. Also, note value is indicated by additions of dots 3 and 6 to symbols using only the top four dots. A plain letter, let's say "d," is an eighth note; dot 3 added (an "n") makes it a half note; a dot 6 added makes it a quarter note (a "t-h" sign); dots 3 and 6 added (a "y") makes it either a whole note or a sixteenth note. (Note: In real Braille music, the letters of the alphabet are not the same as the musical notes.)

The symbol for a sharp is the "s-h" sign (dots 1-4-6), the sign for a flat is the "g-h" sign (dots 1-2-6), and the sign for a natural is the "c-h" sign (dots 1-6. I mention these things in order to give you ideas of how Braille has been adapted so that you can do the same.

Use your needs to determine how intricate your code should be. If you truly need precision, Braille music will be worth your time to learn.

Drawing

With the advent of Braille graphics by computer, it may seem irrelevant to consider doing graphics using a slate or Braille writer. However, this can be useful and fun and requires only an active imagination. Maps of square blocks with labels may be all you need to remind you of street names in your new town. A graph which you need to refer to while writing your term paper may be easily reproduced by you in Braille, so that you do not need a reader present whenever you work on it. A picture for a blind child you know can be a flag or a bear, depending upon your skill. The Guild for the Blind, 180 North Michigan, Suite 1700, Chicago, Illinois 60601, phone (312) 236-8569, has a series of children's books with these pictures in them as well as a book with instructions on how to learn to make them. Even without such directions, you can probably do graphics or drawings of your own. Try it!

Another way of drawing which isn't exactly Braille is using a tracing wheel or raised line drawing kit. The American Printing House for the Blind sells these kits complete with a rubber backing and plastic drawing sheets.

Computer Code

The Code for Computer Braille Notation, as adopted May, 1987 by the Braille Authority of North America (BANA) carefully represents each ASCII character differently than each other printable ASCII character. Unfortunately, Braille contains only 63 distinct symbols so the computer code, which contains 93 printable ASCII characters, uses two Braille cells to represent many ASCII symbols including capital letters. They are preceded by dots 4-5-6. Numbers are dropped as in Nemeth Code. Copies of the Braille computer code can be obtained from your regional library if you need them.

Certain keys on the computer keyboard are represented in a variety of ways. For your own use, pick one way and use it consistently for each key.

You may not have any particular reason to learn the computer code, even if you own a computer. If your needs are not extensive, make up your own code to meet whatever needs you actually have.

Also keep in mind that Braille printers represent specific keystrokes in a prescribed manner in Braille. Unfortunately, there are some differences between these representations and the current computer code. The computer code does not always use Nemeth notation for symbols common to both systems. Find something that works for you and stick with it.

Conclusion

You may find that you need Braille to assist you with things not anticipated in this article. That's fine. Use your imagination and the smattering of information I have offered here. Don't assume there isn't a way. Braille is as versatile as you allow it to be. Learn the existing systems for things for which you have a need and improvise the rest. Use your new skill to meet your reading and writing needs.